

the time to be used in the calculation is September 14, 7h. 58^m. This time follows the epoch in the above table by 2d. 13h. 36^m., and with the motions already given, the value of u corresponding to this interval is found to be $225^{\circ}34'$, with which we enter the table and find the angle of position 226° , and the distance $16''4$. A direct calculation from Prof. Newcomb's tables of the satellite for the reduced Greenwich time gives $226^{\circ}4'$ and $16''4$.

NOTES

THE Chemical Society have lately made the following grants from their Research Fund:—50*l*. to Dr. Tilden, for an investigation into the chemical nature of the terpenes; 50*l*. to Mr. W. N. Hartley, for apparatus and materials required in carrying on a research on the action of organic substances on the ultra-violet rays; 30*l*. to Dr. W. Ramsay, for determining the electric conductivity and resistance of solutions of salts at different temperatures; 20*l*. to Mr. W. Jago, for the purchase of apparatus required for carrying on a research on the organic matter in sea-water; 10*l*. to Mr. W. A. Shenstone, for an examination of certain reactions of brucine and strychnine.

It is understood that Signor d'Albertis has parted with the whole of the extensive zoological collections made during his two last expeditions up the Fly River, New Guinea, to the Marquis G. Doria, of Genoa, who will, no doubt, deposit them in the Museo Civico of that city, of which he is the founder and principal benefactor. These collections were first offered to the British Museum. Signor d'Albertis is now making arrangements for the publication in London of a narrative of his adventures in New Guinea.

WE regret to hear that the valuable collection of Chinese birds made by the late Mr. Robert Swinhoe, F.R.S., is still undisposed of. It was offered, we are told, to the British Museum, but, as too often happens in such cases, declined. It would be greatly to be lamented if this collection, which contains many types of species first described by Mr. Swinhoe, and the originals of his numerous papers on Chinese ornithology, should pass out of the country. It certainly ought to have been acquired for the national collection, even if a little more than what was considered its full value had had to be paid for it.

WE understand that the authors of the "Unseen Universe" are at present engaged on a work intended to serve as a sequel to that well-known volume.

WE are requested to state that Sir Joseph Whitworth having expressed a desire that some important alterations should be made in the conditions of his scholarships, the detailed rules for carrying out his wishes are now under consideration. They will be published as soon as possible; but in order to prevent disappointment this notice is given. No important changes will be made in the conditions of the competitive examination in May, 1879. But the conditions of the tenure and of the amount of the scholarships may be somewhat modified.

THE meeting of the French Association for the Advancement of Science was inaugurated in the large hall of the Sorbonne by an address by M. Fremy on Soda and Steel in 1878. The address was well received by a large audience, but it is generally regretted that the president did not take a subject of wider bearing for his address. MM. Virchow and Haeckel were present during the address. It is the first time that German men of science have taken part in French public assemblies in their private capacity. M. Gambetta was also present. Commandant Perrier gave a sketch of the work done at the last year's meeting of the Association. The number of members is now 2,384, the income for 1877 was 58,000 francs, and its capital 224,897 francs. The grants for 1877 amounted to

13,850 francs. A part of the effect of this scientific assembly is lost this year on account of the number at the Trocadéro, and the multitude of objects demanding the attention of Paris visitors. The morning sittings of the Meteorological Section are held at the Lycée St. Louis, and the evening meeting at the Trocadéro as a Congress of the Exhibition. One of the most interesting addresses will no doubt be that delivered by Dr. Janssen on celestial physics; and he will also give the substance of the papers read by him before the British Association. There are two candidates for the presidency of the meeting of 1880, M. Krantz, Director of the Exhibition, and Col. Laussedat, of the Engineer service. Very probably the former will be successful. Several cities are competing for the honour of receiving the Association in 1880. It seems probable that it will cross the Mediterranean to Algiers; M. Krantz is spoken of as the intended Governor-general of Algiers after the close of the Exhibition. Next year's meeting will take place at Montpellier under the presidency of M. Bardoux, the Minister of Public Instruction. On Sunday the Congress visited the Paris Observatory and the Meteorological Observatory at Montsouris.

At the general meeting of the International Botanical and Horticultural Congress held at the Trocadéro, Paris, on the 16th inst., M. A. de Candolle was elected president. A *soirée* or reception was held on the evening of the 16th, and the members of the Congress went on the 18th to Sagrez, the residence of M. A. de Lavallée, president of the organising committee, by whom they were most hospitably entertained. The collection of hardy woody plants at Sagrez is unique in completeness in every sense.

ON Thursday last Mr. Cunliffe Owen was entertained at luncheon by some of the leading U.S. exhibitors at the Paris Exhibition, on board Capt. Boyton's yacht. Governor M'Cormack, in proposing Mr. Owen's health, spoke very highly of his executive abilities, and his courtesy towards the Americans, and attributes much of the success of the exhibits of English-speaking people to his energy, skill, tact, and good management.

IN the *Times* of August 13 an account is given of the working of the Mallory propeller, a very ingenious mechanical device for propelling and steering a ship in any direction by means of one and the same apparatus, recently brought over to England from America by its inventor, Col. William H. Mallory, of the United States army. It consists of a vertically swivelled screw propeller of peculiar construction, by the aid of which a vessel can be moved sideways, turned rapidly on a circle whose diameter is the ship's length, and can be made to advance or retire with equal rapidity. We cannot see any reason why this propeller may not be very useful for small vessels and others whose turning is more important than speed and sea-going qualities. That it will ever replace the direct propeller seems improbable, as there are three distinctly bad points about it:—1, the gear, which entails a loss of at least ten per cent. of the power; 2, the engines working on to a vertical shaft; 3, the engines being over the counters, which would render the ship very uneasy in a rough sea. Besides this, no vessel would go to sea without a rudder to use in case her engines broke down. On the other hand, the propeller presents many advantages for harbour work, and for such things as rams and torpedo boats.

WE learn from *Harper's Weekly* that, for the purpose of prosecuting biological researches, Prof. A. Agassiz has lately completed a superb establishment near his residence at Newport, wherein every device that experience could suggest has been brought to bear for the convenience of investigators. A building 45 by 25 feet has been erected on the side of a bay making up from the entrance to Newport Harbour, and provided with the purest of sea-water by means of a steam-pump, which keeps a tank constantly filled. The tables are covered with a series of

tiles of different colours, so that the minute animals of different shades can be the more readily overhauled when emptied upon them. The shelves in the laboratory are all of glass, the tanks are of slate, the conducting pipes are of iron, lined with a composition of rubber, which it is believed will protect them against corrosion. These tables are all well lighted, and are available for students, whom Mr. Agassiz invites to share his facilities. Four persons, in addition to himself, at present occupy the laboratory in prosecuting their special researches. There is, probably, no one of the many buildings erected here and in Europe for the prosecution of biological research so elegantly and thoroughly equipped as that to which we refer.

PROF. F. E. NIPHER, of Washington (U.S.) University, has undertaken a magnetic survey of the state in connection with the weather service. The work will require about three years to complete, and he contemplates getting over one-third of the state this summer. He will establish about twenty or twenty-five magnetic stations, to determine the dip of the magnetic needle and the deflection from the magnetic meridian. The professor started out on the survey early in July, accompanied by five or six students from Washington University, who will act as the assistants. He has received a complete set of instruments from the United States Coast Survey, consisting of a dip-needle and declination needle, with theodolite. The party will first go to St. Charles, and up the North Missouri railroad, taking in a territory as far west as Chillicothe, and embracing among the points of observation Hannibal, Macon City, Mexico, Columbia, Fulton, Kirksville, Moberley, and other eligible points.

MR. AUGUSTUS FENDLER, whose collections of plants, made thirty years ago in the vicinity of Santa Fé, were made known by Prof. Gray, and who for many years resided in Venezuela as a botanical collector, is now prosecuting similar work in the Island of Trinidad, devoting himself to the gathering of ferns and fern-like plants. Sets of the first series of these, embracing the first thirty-eight species, are procurable at a moderate price from the curator of Harvard University Herbarium, Cambridge, Massachusetts. They have all been named by Prof. Eaton, of Yale College.

SOME months ago we gave an account of the explorations of a young American, Mr. Herbert H. Smith, on the Amazon, referring to some geographical discoveries made by him, as also to his success in securing a large series of insects. Mr. Smith left New York on July 6 for Brazil, first to complete his work on the Amazon, and then to proceed to the southern provinces of Brazil.

A VIOLENT earthquake is reported from Innsbruck. It occurred on the 9th inst. at 12.40 P.M., and was accompanied by loud subterranean noise. At 9 A.M. on the 26th, earthquake shocks were felt over a great part of Belgium and Holland, and in Rhenish Prussia at about 11 A.M. A shock of earthquake was felt at nine on the morning of the 26th inst. at Liège, doors and windows being much shaken and chairs disturbed. It was also felt at Elberfeld, Cologne, Osnabrück, and Barmen. At Barmen houses were upreared, roofs displaced, furniture shaken, and goods in the shop windows overturned. The shocks were repeated about eleven at Elberfeld, Düsseldorf, Cologne, and Bonn.

AT Halberstadt a remarkable *Fata Morgana* was observed on the 5th inst. at 7.10 P.M. The phenomenon is described by an eye-witness, who states that in a stratum of cloud in the direction of the Brocken both house and tower standing on the summit of that mountain were reproduced in distinct outlines and on a gigantic scale; even the windows could be recognised. The duration of the phenomenon was about one minute.

THE meeting of German anthropologists took place at Kiel on the 12th, 13th, and 14th inst., and was well attended. Strassburg was chosen as the meeting-place for next year. Prof. Schaaffhausen of Bonn presided, and addresses were delivered by Professors Handelsmann, Mehlig, Virchow, Ranke, Stieda, and others. On August 14 an excursion was made to Lübeck. The Schleswig-Holstein Anthropological Society had arranged an interesting exhibition for the occasion.

THE British Archæological Association concluded a very successful meeting at Wisbeach on Saturday. Under the presidency of the Bishop of St. David's, the Cambrian Archæological Association held its annual gathering at Lampeter last week.

A CANTON correspondent, under date April 12, sends us the following account of the tornado of April 11:—Yesterday afternoon, April 11, Canton was visited by a whirlwind of terrific force and unparalleled destructiveness. There was a thunder-storm from 2 P.M. to 3.30; when this was over, lumps of ice, about the size of pigeons' eggs, but shaped like the star-fish, fell in great quantities. Our surprise was hardly over at this strange phenomenon (thermometer 80° F. in the shade) when a noise was heard, like that made by the screw of a ship as a person on board sleeping close to it would hear it, rising and falling in regular rhythm. This sound was occasioned by the travelling of a wind of an intensity that baffles description, which burst upon the city and settlement, scathing and blasting everything which came within its fell grasp. For a space of time, variously estimated at from three to five minutes, it performed its work of destruction, uprooting trees, unroofing houses, overturning walls, engulfing boats, and leaving behind a scene of desolation such as only an eye-witness would believe in. The path along which the tornado passed was converted into shapeless ruins, but fortunately its width was not more than 200 yards. In Shamien (the foreign settlement) 134 large banyans, some of eighteen years' growth, have been blown down, most of them torn up by the roots, and in rare cases the trunks have been rudely snapped in two. A large banyan, distant twenty yards from our house, was torn up and hurled roots foremost, right into the verandah, smashing to chips the solid stone balustrade. One single instance will give you a fair idea of the force of this hurricane. A tile was found sticking in the side of a tree (in the Consulate grounds), into which it had penetrated two inches. A coolie was killed on the road fifty yards from our house by a brick blown away. Men were blown yards into the air and killed, and in one instance, a cow was blown up, but was not killed. The stone seats in the Bund, and stones over a ton weight have been driven yards away. The immense granite blocks forming the parapets of the bridge were hurled bodily into the canal. The track followed by the tornado through the native city is marked by a confused mass of bricks and mortar, and in some places there is literally "not left one stone standing on another." According to a native estimate the number of houses entirely destroyed is about 5,000, the total damage to foreign houses about 12,000*l.* sterling, and the loss of life 6,000. Already 4,000 corpses have been interred, and more are being dug up every minute.

WE have received the first part (*Polyptelea*) of a "Diagnoses Plantarum Novarum vel minus Cognitarum Mexicanarum et Centrali-Americanarum," by Mr. W. B. Hemsley. This, we believe, is merely the forerunner of a work of great extent and importance which Mr. Hemsley has undertaken, of the scope of which the following statement may give some idea. It may be known to some of our readers that Messrs. Godman and Salvin, aided by various specialists, have for many years been engaged in working up the zoology of Central America and Mexico. About three years ago it occurred to them that it would add greatly to the interest of their work if the botany could be so far worked

up as to determine the general laws of distribution for comparison with those obtaining in the animal kingdom. After some consultation with Sir J. D. Hooker, and other botanists, it was decided to make the Kew herbarium the basis of an enumeration of all the plants hitherto found in the countries lying between Panama and the territories of the United States. The principal reason that led to this decision was the fact that the vast collections at Kew have recently been carefully studied for Messrs. Bentham and Hooker's "Genera Plantarum," and for various other publications, so that as far as generic types are concerned, Kew herbarium is perfectly available and reliable for the object in view. To this will be added all the species published, but not represented at Kew by named specimens, and the novelties contained in the collections made by the French Scientific Commission. The enumeration will be supplemented by references, localities, altitudes, and everything that will be useful in drawing up an essay on the distribution, &c., of the plants. Although it was impossible to undertake a critical examination of all the species, a considerable number of interesting and apparently new species will be described, and many of them figured, from drawings by Fitch, and coloured drawings done on the spot by Mrs. Salvin.

THE valuable collection made by the Brothers von Schlagintweit during their extensive journeys through India and Thibet is now arranged for exhibition in the royal castle at Nuremberg. It forms one of the most extensive collections ever brought from the East, and possesses objects of rare value, especially for anthropology. Among these might be mentioned the plastic representations of Indian races, numbering 275 specimens, prepared from casts taken from living individuals, and carefully arranged according to castes and races. A large variety of skulls from different regions in India will also prove of no small use to the growing number of students of cranial development.

WE notice the death at Paris of M. J. Fordos, a well-known French chemist, and vice-president of the Paris Chemical Society. His name is chiefly known in connection with researches on thiocacids, and numerous derivatives of sulphur, ligneous colouring matters, estimation of morphia, and several technical subjects, especially the manufacture of cyanides and ferro-cyanides.

PROF. SUESS, the well-known Vienna geologist, is at present traversing Italy with a number of his students, engaged in a geological study of the peninsula. The journey includes Vesuvius and Etna.

THE additions to the Zoological Society's Gardens during the past week include a Prairie Wolf (*Canis latrans*) from the Rocky Mountains, North America, presented by Prof. M. C. Vincent, F.G.S., F.R.G.S.; a Common Jackal (*Canis aureus*) from India, presented by Mr. J. Smith; a Spotted Ichneumon (*Herpestes aurofunicatus*) from Nepal, presented by Mr. W. Pyne; a Bronze Fruit Pigeon (*Carpophaga anea*) from India, presented by Mr. A. H. Jamrach; a White-eared Bulbul (*Pycnonotus leucotis*) from North-West India, presented by Mr. W. Woolner; a Black Saki (*Ptilocercus satanas*) from the Lower Amazons, deposited.

THE BRITISH ASSOCIATION REPORTS.

Report of the Committee for Commencing Secular Experiments on the Elasticity of Wires, by J. T. Bottomley.—The Committee have to report that the arrangements for suspending the wires for secular experiments on elasticity are now complete, and that within the last few days two wires, one of palladium and the other of platinum, have been suspended in their places.

An iron tube has been erected in one of the rooms in the tower of the University Buildings in Glasgow. It is 60 feet long, 9 inches wide, and $4\frac{1}{2}$ inches deep from face to back. It is of rectangular section, in lengths of 6 feet, and it is sup-

ported by being firmly attached to the heavy outer stone wall of the tower.

At the top of the tube there is a heavy gun-metal plate which is supported independently of the iron tube; and from this plate the wires under examination are to be suspended, as well as additional wires to be used for carrying additional comparison marks. With this arrangement no yielding of the supporting plate that may take place will introduce errors into the results of measurement of the lengths of the wires; for the point of support of the wire carrying comparison marks will experience the same amount of lowering, due to the yielding, as is experienced by the wire to be measured against these marks. The gun-metal plate has been pierced with three rows of holes, through which the wires are to pass. The holes are trumpeted at each end, so as to avoid sharp contact with the wires; and the rows are arranged so that the wires shall hang down in their planes parallel to the face of the tube. It has not yet been decided what is the best way of fixing the upper ends of the wires above the gun-metal plate, or of attaching the weights to their lower ends. No thoroughly satisfactory mode of attachment has yet been found. In the course of experiments to be referred to immediately, which have been carried on at Glasgow on the breaking weight, and the Young's Modulus of Elasticity of the gold, platinum, and palladium wires, which, it is intended, shall be first suspended for examination, several modes of suspension have been tried; but it has not been found possible to make sure of avoiding very considerable weakening of the wire at the points of attachment at the ends.

At the bottom of the iron tube there is a window of plate glass through which the lower parts of the wires can be viewed, and the window can be drawn up so as to allow of the lower parts of the wires being reached.

In front of the window a strong gun-metal table is set up. It is supported independently of the iron tube and of the floor of the room, on iron brackets fixed to the stone wall of the chamber, and is very carefully levelled. On this table a cathetometer is carried, by means of which marks on the wires are to be observed. The cathetometer moves on the table parallel to the planes of the rows of wires. It has the two back feet of the triangular sole plate on which it is supported movable in a V-groove cut in the table, the third foot resting on the plane upper surface. There is also a slot cut in the table through which a screw passes up from below to the sole plate of the cathetometer, and by means of this screw the cathetometer can be clamped in any required place.

The cathetometer is a small instrument which has been constructed by Mr. James White of Glasgow for the purpose of these experiments. The main pillar is one foot high. It is supported on a sole plate having three levelling screws. The telescope or microscope, having cross-fibres, is raised or lowered on this pillar on a proper geometrical slide, and has also a lifting screw in connection with a vernier for giving fine adjustment. The vertical pillar is carefully graduated; and by means of this scale the differences of levels of proper marks put upon the wires are to be determined.

The arrangements have only been completed within the last few days. They require to be carefully tested in several points, and particularly the cathetometer requires careful examination. There is every reason, however, to expect that the work will turn out quite satisfactory. As soon as possible the work of testing will be completed and wires suspended, measured and marked.

During the past year experiments in connection with this investigation have been carried on in the laboratory of the University of Glasgow on the breaking weights and elastic properties of various wires. In the first place the breaking weights and the Young's modulus, or modulus of elasticity for longitudinal pull, have been determined for the gold, platinum, and palladium wire with which it is proposed that the secular experiments on elasticity shall commence. A large number of experiments on the effect of stress, maintained for a considerable time, in altering the breaking weight and the extension under increased stress of various wires, have been carried on. Soft iron wire, steel wire, and tin wire in particular, have been experimented upon, and already some interesting results have been obtained, showing that prolonged application of stress certainly produces a noticeable effect.

Numbers showing the nature of the results already arrived at are appended; but the whole subject still requires much careful examination.